Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-5, and 7 are pending in the application, with claim 1 being the independent claim. Claims 1 and 2 are amended to cancel the non-elected invention. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

I. Rejections under 35 U.S.C. § 112

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 4 has been amended to replace the term "at least one" with the term "one or more" as suggested by the Examiner. Amendment of the claim herein renders this rejection moot.

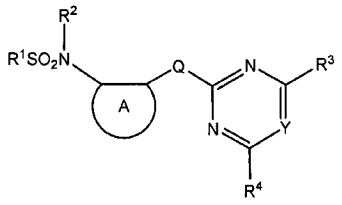
II. Rejections under 35 U.S.C. § 103

Claims 1-5 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Gates *et. al.* (US Patent No. 5,885,935) ("Gates") in view of Yoshimura *et. al.* (US Patent No. 6,458,748) ("Yoshimura"). Applicants respectfully traverse the rejection.

1. Prima Facie Case of Obviousness Has Not Been Established

A. Gates

Gates generically discloses a very broad genus of compounds of the following formula:



wherein

A represents a substituted or unsubstituted benzene, or a 5-membered unsubstituted or substituted heteroaromatic ring selected from the group consisting of unsubstituted or substituted thiophene, furan, pyrrole, thiazole, isothiazole, pyrazole, imidazole, oxazole and isoxazole ring, any substituent on a carbon atom of which is halo, cyano, a group -$COOR_{10}$ where R_{10} represents hydrogen or an optionally-substituted alkyl group, or an optionally-substituted alkyl, alkoxy, aryloxy, heterocyclyloxy or amino group, and any substituent on a nitrogen atom of the ring A is a substituted or unsubstituted alkyl, alkoxy, amino or aryl group;
Q represents -O-, -S-or a group -CXX'-;
X and X', which may be the same or different, are each hydrogen, halogen, cyano, an optionally-substituted alkyl group or a group -OR^a, -SR^a, or -COR^b; or one of X and X' represents hydroxy and the other is as defined above; or X and X' together represent =O or =S;
. . . .
Y represents -CH- or N;
R^1 represents an optionally-substituted alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heterocyclyl, benzoheterocyclyl or amino group;
. . . .

See Gates, column 1, lines 10-67.

Thus, *Gates*' general formula encompasses hundreds of thousands (if not millions) of compounds. However, none of the examples described in *Gates* disclose a compound of Formula (I) as claimed in claim 1 of the present application.

a. Examples A1-A127 of Gates

The Examiner stated that *Gates* teaches several heterocyclic sulfonamides useful as herbicides which include generically Applicants' claimed compounds. Specifically,

according to the Examiner, examples A1-127 include generically the claimed compounds. Applicants respectfully traverse.

Among examples A1-A127 specified by the Examiner, only examples A5-A17 and A105-A127 are compounds wherein A is a phenyl group or a substituted phenyl group and Y is CH as required in claim 1 of the present application. However, none of examples A5-A17 and A105-A127 is a difluoromethanesulfonamide (R^1 is CHF_2) as required in claim 1 of the present application. Thus, none of examples A1-A127 fall within Formula (I) of claim 1 of the present application.

b. Examples A92 and A95 of Gates

The Examiner stated that examples A92 and A95 of *Gates* differ from the claimed compounds in having a CF_3 (*Gates*) instead of a CHF_2 group (claimed compounds). Applicant respectfully traverse.

Examples A92 and A95 of *Gates* are compounds wherein A is a pyridyl ring (E=N). *See Gates*, column 12, lines 7 and 9. Claim 1 of the present application requires a phenyl ring at this position. Thus, not only do examples A92 and A95 of *Gates* differ from Applicants' claimed compounds in having a CF_3 (*Gates*) instead of a CHF_2 group (claimed compounds), but they also differ from the claimed compounds in having a pyridyl group (*Gates*) instead of a phenyl group (claimed compounds). Thus examples A92 and A95 of *Gates* are not compounds which only differ from the claimed compounds as the Examiner stated.

c. Examples A108 and A109 of Gates

The Examiner further stated that examples A108 and A109 are positional isomers. Applicants respectfully traverse.

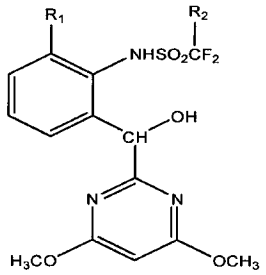
Examples 108 and A109 are not positional isomers because example A108 is a monobromo-substituted trifluoromethanesulfonamide, while example A109 is a difluro-substituted cyanomethanesulfonamide. These compounds are not difluoromethanesulfonamides as required in claim 1 of the present application. Therefore, examples A108 and A109 of *Gates* are not positional isomers of the compounds of Formula (I) as claimed in claim 1.

B. Yoshimura

The Examiner stated that *Yoshimura* teaches several difluoromethane and trifluoromethanesulfonamides as herbicides. According to the Examiner, examples 1-4 in *Yoshimura* teaches the equivalency of difluoromethanesulfonamides with trifluoromethanesulfonamides. Applicants respectfully traverse.

a. Difference Between Compounds in Yoshimura and Claimed Compounds

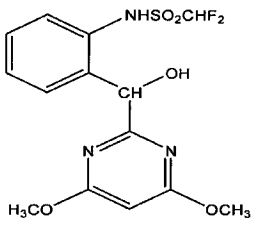
Yoshimura discloses a genus of compounds of following formula:



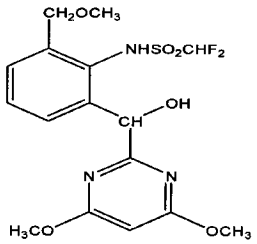
wherein ***R^1 is a hydrogen atom, an alkyl group or an alkoxyalkyl group***; and R^2 is a hydrogen atom when R^1 is a hydrogen atom or an alkyl group, and is a hydrogen atom or a fluorine atom when R^1 is an alkoxyalkyl group.

See Yoshimura, column 2, lines 10-29, emphasis added.

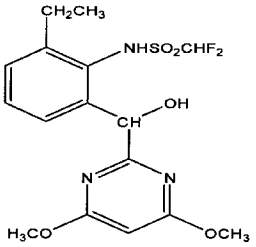
More specifically, examples 1-4 of *Yoshimura* have following structure:



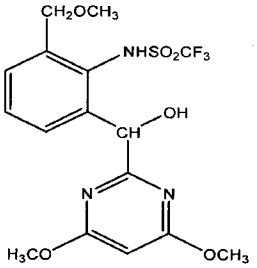
Example 1 of *Yoshimura*



Example 2 of *Yoshimura*



Example 3 of *Yoshimura*



Example 4 of *Yoshimura*

Thus, *Yoshimura* does not disclose a compound of the present application because R^1 in *Yoshimura* is not a halogen as recited in Applicant's claims. As shown above, examples 1-4 of *Yoshimura* contain a hydrogen, an ethyl or a methoxymethyl substituent on the phenyl ring at the position *ortho* to the sulfonamide. Claim 1 of the present application requires a halogen substituent on the phenyl ring at the position *ortho* to the sulfonamide. Furthermore, *Yoshimura* does not teach to modify the hydrogen, the ethyl or the methoxymethyl substituent to a halogen substitutent as recited in Applicant's claims.

b. Equivalency of Difluoromethanesulfonamides with Trifluoromethanesulfonamides

The Examiner stated that examples 1-4 in *Yoshimura* teach the equivalency of difluoromethanesulfonamides with trifluoromethanesulfonamides. Applicants respectfully traverse.

Examples 2 and 4 of *Yoshimura* are methoxymethyl substituted difluoromethanesulfonamides and trifluoromethanesulfonamides. Examples 2 and 4 have similar herbicidal effect when tested at a certain application rate and on three types of weeds. (*Yoshimura*, Table 1, columns 15 and 16.) Thus, at most, examples 2 and 4 teach the equivalency of a difluoromethanesulfonamide with a trifluoromethanesulfonamide where the phenyl ring is substituted by a methoxymethyl group at the position *ortho* to the sulfonamides. However, *Yoshimura* does not disclose or teach that a difluoromethanesulfonamide would have an equivalent or better herbicidal effect than a trifluoromethanesulfonamide when the phenyl ring is substituted by a halogen group at the position *ortho* to the sulfonamide as required in claim 1 of the present application.

In summary, *Yoshimura* does not disclose or teach a person of ordinary skill in the art to make a compound of Formula (I) as claimed in claim 1 of the present application. Furthermore, *Yoshimura* does not disclose or teach equivalency of difluoromethanesulfonamides with trifluoromethanesulfonamides where the phenyl ring is substituted by a halogen group at the position *ortho* to the sulfonamides.

C. No Motivation to Combine Gates with Yoshimura

The Examiner stated that "the generic definition of *Gates* include a methoxymethyl group in the phenyl ring (A ring) and *Gates* explicitly teaches halogen for the said group." The Examiner further stated that "it would be obvious to one trained in the art to make both difluoromethanesulfonamide and trifluoromethanesulfonamide as herbicides bearing halogen in the phenyl ring and expect the compounds to have herbicidal activity in view of equivalency teachings." Applicants respectfully traverse.

According to the Examiner, when arriving at the compounds of claim 1 of the present application, a person of ordinary skill in the art would first select from *Gates* a trifluoromethanesulfonamide compound having an *ortho*-halogen substitution on a phenyl ring, then replace the trifluoromethanesulfonamide with a difluoromethanesulfonamide in view of *Yoshimura*. The Examiner has not articulated a particular reason why a person of ordinary skill in the art would make such a selection and modification.

The claims of the present application are directed to difluoromethanesulfonamide compounds having an *ortho*-halogen substitution on the phenyl ring. There is no teaching or suggestion in *Gates* that a person of ordinary skill in the art would select a trifluoromethanesulfonamide compound having an *ortho*-halogen substitution on the phenyl ring as a lead compound for developing an improved herbicide. *See Takeda Chemical Industries, Ltd., v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1362-1363 (Fed. Cir., June 28, 2007) ("Alphapharm failed to adduce evidence that compound b would have been selected as the lead compound"). To the contrary, in *Gates* it is noted that examples A7 and A9, trifluoromethanesulfonamide compounds having an *ortho*-halogen substitution on the phenyl ring, do not exhibit a superior herbicidal effect in pre-emergence studies or post-emergence studies, as compared to examples A6 and A8, cyanomethanesulfonamide compounds having *ortho*-halogen substitution on the phenyl ring. *See Gates*, columns 22-23. Thus, a person of ordinary skill in the art reading *Gates* would not be motivated to select a trifluoromethanesulfonamide compound having an *ortho*-halogen substitution on the phenyl ring as the most promising compound to modify as suggested by the Examiner. *See Takeda*, 492 F.3d at 1357 ("By 'lead

compound,' we understand Alphapharm to refer to ***a compound in the prior art that would be most promising to modify*** in order to improve upon its antidiabetic activity and obtain a compound with better activity.")

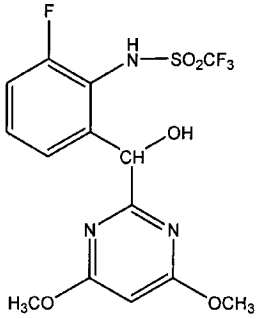
Even if a person of ordinary skill in the art reading *Gates* would be motivated to select a trifluoromethanesulfonamide compound having an *ortho*-halogen substitution on the phenyl ring, there in no teaching, suggestion or motivation in *Gates* to replace the trifluoromethanesulfonamide with a difluoromethanesulfonamide group. *Yoshimura* does not remedy the deficiency of *Gates* because, as discussed above, *Yoshimura* does not disclose or teach an equivalent or superior herbicidal effect of difluoromethanesulfonamides having an *ortho*-halogen substitution on the phenyl ring, as compared to the corresponding trifluoromethanesulfonamides.

For the reasons above, the Examiner has not establish a *prima facie* case of obviousness because the Examiner has not articulated a particular reason why a person of ordinary skill in the art would make a compound of Formula (I) of claim 1 of the present application in view of *Gates* and in further view of *Yoshimura*. *See Takeda*, 492 F.3d at 1356 and 1357 ("In addition to structural similarity between the compounds, a prima facie case of obviousness also requires a showing of 'adequate support in the prior art' for the change in structure" (*citing In re Grabiak*, 769 F.2d 729, 731-32 (Fed. Cir. 1985)); "[I]n cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound.")

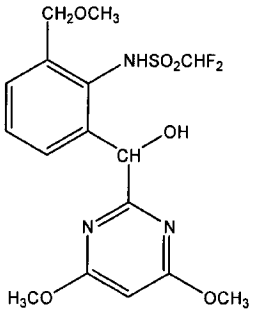
2. Unexpected Results

The Examiner stated that the specification includes unexpected/superior results but the comparison of prior art compounds is limited and does not include compounds taught in *Gates* and the secondary reference.

Applicants respectfully submit that two (2) comparative compounds, C-1 and C-2 were included in the specification. They have the following structures:



C-1



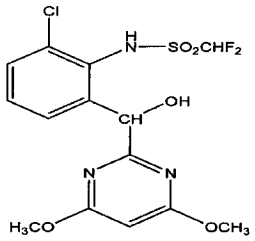
C-2 (Example 2 of *Yoshimura*)

See specification, page 36.

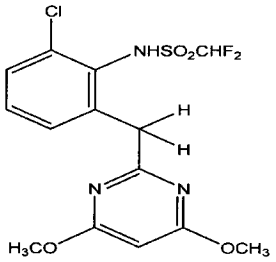
The comparative compound C-2 is, in fact, Example 2 of *Yoshimura*. The comparative compound C-1 is encompassed by the general formula of *Gates*. Because *Gates* does not specifically disclose any compounds containing the difluoromethanesulfonamide group as recited in Applicants' claims, a comparison with any compounds specifically disclosed in *Gates* would not be very meaningful. Thus, the unexpected/superior results as acknowledged by the Examiner are results in comparison to a compound encompassed by *Gates* and Example 2 of *Yoshimura*.

Tables 5, 7 and 8 of the specification of the present application provide data comparing compounds of Applicants' claims with comparative compound C-2 (Example 2 of *Yoshimura*). Specifically, the data in Tables 7 and 8, at pages 42-43, demonstrate that there is an unexpected benefit of lower phytotoxicity with compounds 3 and 11

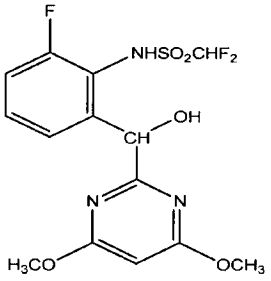
(*ortho*-halogen substituent, difluoromethanesulfonamide) of the present application when compared to comparative compound C-2 (*ortho*-methoxymethyl substituent, difluoromethanesulfonamide) and comparative compound C-1 (*ortho*-halogen substituent, trifluoromethanesulfonamide). At the same application rate, compound 11 caused only 10-15% injury in transplanted rice versus comparative compounds C-1 and C-2 which caused 20-35% and 30-40% injury respectively in transplanted rice (Table 7). Compounds 3 and 11 caused only 10-20% injury in direct-seedling rice compared to 30-50% injury in the case of comparative compound C-2 (Table 8). The data in Tables 7 and 8 clearly demonstrate that the presence of *both,* an *ortho*-halogen substituent on a phenyl ring and a difluoromethanesulfonamide group, led to surprisingly superior herbicidal activity and lower phytotoxicity.



Compound No. 3



Compound No. 11



Compound No.1

The data in Table 5 further demonstrates that the difluoromethansulfonamide compounds 1 and 11 (*ortho*-halogen substituent, difluoromethanesulfonamide) of the present application have unexpectedly superior herbicidal effect compared to comparative compound C-2 (*ortho*-methoxymethyl substituent, difluoromethanesulfonamide) and comparative compound C-1 (*ortho*-halogen substituent, trifluoromethanesulfonamide). Compounds 1 and 11 showed sufficient residual herbicidal effectiveness for 3-4 weeks against all the species of weeds tested. At the same application rate, comparative compound C-1 showed sufficient residual effectiveness of 1 week or less against at least four of the species of weeds tested and comparative compound C-2 showed residual effectiveness of only 2 weeks against at least three of the species of weeds tested. The data in Table 5 clearly demonstrate that the presence of *both,* an *ortho*-halogen substituent on a phenyl ring and a difluoromethanesulfonamide group led to surprisingly superior herbicidal activity.

In summary, the compounds of the present application showed unexpected and superior herbicidal activity when compared to compounds disclosed in the references cited by the Examiner.

Conclusion

All of the stated grounds rejection have been properly traversed or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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Date: 2-12-08

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